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U.S. DEPT. OF AGRICULTURE

LIVESTOCK EXHIBITS

of the

UNITED STATES DEPARTMENT OF AGRICULTURE

at the

TWENTY-SIXTH

INTERNATIONAL LIVE STOCK EXPOSITION

Chicago, Illinois

November 28 to December 5,

1925.



F O R E W O R D

Since the earliest times, visual instruction has been utilized to convey the latest thought in art and science. During recent years, exhibits have been a popular means of appeal in the field of agriculture.

For the fifth successive year the United States Department of Agriculture is presenting a livestock exhibit at the International Live Stock Exposition.

As on previous occasions, the Department has endeavored to point the way to more intelligent methods of livestock production. The data presented and the practices recommended are based on practical experiments conducted by the Department and various State agencies, in many instances in collaboration with livestock farmers.

This pamphlet has been prepared to enable those who view the exhibit, to possess a permanent record of the information which it contains.

Representatives of the Department accompanying the exhibit are ready to explain to visitors various lines of the Department's work and to discuss livestock problems generally.

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THE HORSE MART

There are about 2,500,000 horses and mules employed in non-agricultural service (cities, towns, villages, mines, lumber camps, etc.) in the United States of which about half a million horses are in use under saddle. Replacements in this field must be furnished by the producer, giving the farmer an important outlet for his surplus animals. Horses for commercial service, sport, and recreation are purchased to fill certain specific needs, and the market which supplies these demands is becoming more and more exacting in its requirements. When good horses of the right type and merit are presented, top prices are readily obtained. The progressive breeder is one who keeps informed regarding the market and endeavors to produce animals which will meet these demands. Inferior horses which have no definite market demand are a drag on the market, and naturally affect the prices of all classes of horses.

The horses in this exhibit were selected as representative specimens of the market classes for which the greatest demand exists today. Some characteristics and requirements of each class are enumerated below.

Draft Horses

This class of horses should be massive, muscular and capable of pulling heavy loads at the walk. The principal considerations in this class are weight, strength, conformation, soundness, stamina and good action. Draft

horses range in height from 15 hands 3 inches to 17 hands 2 inches and vary in weight from 1600 to 2200 pounds. The best horses of this class are known on the market as Heavy Drafters and weigh from 1750 to 2200 pounds; those of the next group, called Light Drafters, weight between 1600 and 1750 pounds; while a third group called Loggers, are similar in type to the Heavy Drafters but plainer and sometimes blemished or unsound.

Horses of the draft class are used chiefly by farmers, draymen, wholesale commercial concerns, contractors and lumbermen. High class geldings are in demand chiefly for city use, and greys or any of the solid colors are acceptable. White is the only color not desired. The Percheron, Belgian, Clydesdale, Shire and Suffolk are the prominent draft breeds in the United States. Market demands are met by purebreds of these breeds and by grades and crossbreds produced from intermixtures of draft blood.

Wagon Horses

Horses of the wagon-horse class vary somewhat in conformation, height and weight, depending upon the work which they do. This class includes Expressers, Delivery-wagon horses and Artillery horses, with height and weight specifications as follows: Expressers: height, 15 hands 3 inches to 16 hands 2 inches, weight, 1350 to 1500 pounds; Artillery horses: height, 15 hands 1 inch to 16 hands, weight, 1050 to 1200 pounds; Delivery-wagon horses: height, 15 hands to 16 hands, weight, 1100 to 1400 pounds.

Expressers and delivery-wagon horses are the most important members of this class. Such horses are generally sturdy, short-coupled, compact individuals with excellent feet, legs and action. The trot is the common business gait for this class. The utility of the wagon horse is indicated by the names of its subclasses. Expressers are used in collecting and delivering goods; delivery-wagon horses are employed by all sorts of mercantile concerns; the artillery horse is used in the Army. As found in the draft class, geldings are given preference for city use, with greys or solid colors most in demand. Wagon horses are intermediate in weight, between the draft and light horse breed, and are commonly produced by crossing the heavy and light types.

Farm Chunk

The farm chunk class is composed of medium-sized, low-set, blocky horses, somewhat light in bone and often lacking in quality, but capable of performing all farm tasks of an ordinary nature at the walk or trot. Limitations for the class are: height, 15 hands to 15 hands 3 inches, and weight, 1200 to 1400 pounds.

The Hunter

Hunters are classed as light-, middle-, and heavy-weight, according to their size and weight, with ranges in height from 15 hands 2 inches to 16 hands 1 inch and in weight from 1000 to 1350 pounds. The use to which hunters are put demands a horse of more size, ruggedness and constitution than other types of saddle horses. He must be up to carrying his

rider at good speed, across country, over long distances, and jumping fences and ditches, when required to do so. He must be a good horse of courage and good manners. The hunter must have bone of good size and quality, and there must be an evidence of rugged constitution throughout his conformation; otherwise he can not long withstand the hardships of the hunting field. These are usually produced by using Thoroughbred sires on well-bred mares of quality and size, which often carry some proportion of draft blood.

Saddle Horses

Saddle horses are usually classified into the five-gaited saddler and the walk-trot-and-canter or three-gaited horse. The size of the three-gaited horse is variable according to the character of the work and the weight of the rider. The height is usually from 15 hands 1 inch to 15 hands 3 inches, and weight from 1000 to 1250 pounds. The principal requirements in three-gaited horses are style, quality, finish and good manners. Dark colors are much preferred in saddle classes, including bay, brown and chestnut. These are produced by using purebred saddle stock or Thoroughbred sires on mares of quality having saddle conformation.

Polo Ponies

Polo ponies should range in height from 14 hands 2 inches to 15 hands 1 inch and in weight from 850 to 1050 pounds. The polo pony must combine speed, activity, agility and general handiness with weight-carrying ability. He must have a light mouth and must have the ability to stop, start and wheel quickly. The game of polo requires a lot of endurance and wearing quality in the pony; hence the conformation of the horse, especially in the hind quarters, feet and legs, largely determines his adaptability to the game.

HOW MANY LITTLE PIGS GET TO MARKET?

The hog grower can to a certain extent limit the death rate among his hogs. Among all classes of livestock and among humans there are inevitable losses which can not be prevented. Some losses, however, are unavoidable.

Increased knowledge of animal diseases and their prevention, more careful management of breeding animals and closer attention to them at the time of bearing young will tend to lower mortality rates and be productive of greater vigor and enhanced efficiency in the feed lot.

Carefully kept records of feed consumption and of losses from various causes have been used in the preparation of this exhibit. The data are based on five years' records of a hog farm under the observation of the United States Department of Agriculture, and are regarded as representative of average conditions.

Gestation Period

Total feed consumption of 27 sows from the time of breeding to the time of farrowing was prorated among 200 pigs actually farrowed from 25 of these, both dead and living pigs being considered. An average litter of $7\frac{1}{2}$ pigs per sow bred was secured.

The feed requirement per pig was approximately 140 pounds of corn, tankage, middlings, alfalfa hay and mineral balanced by the sow on self-feeders. This represented $1\frac{1}{4}$ pounds of feed per pig per day for the entire gestation period of 112 days.

E a c h p i g f a r r o w e d d e a d c o s t
1 4 0 p o u n d s o f f e e d .

Suckling Period

One hundred eighty-two pigs were farrowed alive and these represented potential market hogs.

The first 10 days are full of hazards for the newborn pig. During this period weak pigs die or are killed, accidental deaths and cripples occur, digestive disturbances, and faults of management bring the toll of loss to a point which staggers even the hog man who has yearly experienced these losses, but who has never tabulated them.

The feed cost per pig from farrowing to weaning at 10 weeks, based on feed consumption of sows and pigs, was approximately 120 pounds of mixed feed (corn, tankage, shorts, linseed oil meal and mineral mixture self-fed). This represents an equivalent of $1 \frac{3}{4}$ pounds of feed per pig per day during the suckling period of 70 days.

A pig dying at any time
from farrowing to weaning
represents a loss of $1 \frac{3}{4}$
pounds of feed for each day
which it lived.

Growing and Finishing Period

Of the 200 pigs farrowed, both dead and alive, 128 were successfully weaned at 10 weeks and began the development and fattening periods.

The feed cost per pig during the 8 weeks following weaning was 100 pounds or approximately 2 pounds of feed per pig per day.

During the second 8 weeks period the feed cost was approximately 242 pounds or $4 \frac{1}{3}$ pounds of feed per pig per day.

The final fattening or finishing period required approximately 388 pounds of feed or 7 pounds of feed per pig per day.

The feed loss for each pig dying therefore is cumulative from the time of breeding the sow until the death of the pig. The determination of these costs by actual feeding and health records shows that 14 $\frac{3}{10}$ per cent of the total feed consumption was expended for pigs which failed to reach the market.

Included in the figures of total feed consumption is the feed of the sows which farrowed, figured from the time of breeding to the weaning of the pigs; the feed consumed by the sows which were bred but failed to farrow; and the total feed consumed by all of the pigs.

While some losses may be prevented others must be recognized as unavoidable. The feed cost of dead pigs is properly chargeable as a cost against the marketed hog.

Limitation of death favors profits in all livestock production.

The exhibit portrays a farm on which the 27 sows were bred, with 25 of them farrowing 200 pigs.

During the first 10 days:

- 13 of these pigs were farrowed dead.
- 10 were weak at birth and perished within a few hours.
- 20 were mashed, crippled or eaten by the sows.
- 7 died from all other causes.

During the suckling period of 10 weeks:

- 17 pigs died, were crippled or killed because unthrifty.

During the growing and finishing period of 24 weeks:

- 16 pigs died, were injured, or killed as unprofitable feeders.

A total of 112 pigs from the original 200 farrowed, reached an average weight of 200 pounds and are shown loading for market.

A tabulation of the more common causes of losses and suggestions for reducing them follows on the next page.

COMMON LOSSES	USUAL CAUSES	HOW TO REDUCE THEM
Dead at birth	: Faulty feeding and management of sows during gestation and farrowing	: Careful feeding and management with plenty of exercise.
Weak		
Scours		
Chilled	: Damp, cold floors and draughty quarters.	: Warm, dry, well-ventilated and lighted pens.
Thumps	: Highly nourished pigs without opportunity for exercise when confined in cold, poorly-lighted pens.	: Exercise and sunlight
Eaten by dams	: Nervous sows or deficiency in protein and mineral feed during gestation period.	: Careful feeding during gestation and quiet-natured sows.
Mashed and crippled by dams	: Poorly-equipped farrowing pens and accident.	: Guard-rails in farrowing pens and elimination of nervous, cross, sows.

Sore-mouth	:Foul quarters and filthy	:Clean sod land for pasture,
Bull nose	:wallows	:Frequent plowing of hog lots.
Parasites	:	:Sanitation
Respiratory diseases	:	:
Pneumonia	:Damp quarters, cold floors	:Warm, dry, well-bedded floors,
Fleurisy	:and exposure to cold rains	:free from dust. Good ventila-
"Flu"	:and winds	:tion.
Hog cholera	:	:
	:Exposure to infection	:Serum-virus vaccination
Sunstroke and heatstroke	:	:
	:Severe exposure to hot sun	:Shade and good management
	:and exhaustive movement	:
	:of hogs in hot weather	:
Accident	:	:
	:Various agencies	:Avoidance of conditions fav-
	:	:oring accident.
	:	:

STEER FEEDERS - WATCH THE MARKET!

To acquaint cattlemen with the usual variations of feeder- and fat- cattle prices during the year; and to encourage cattle feeders to watch the market more closely and to plan their feeding operations in the light of what has happened in the past, is the purpose of this exhibit. It does not offer a "royal road to success" in cattle feeding. Many experienced feeders are acquainted with the advantages to be gained by thus profiting by past market performances.

The average prices received for slaughter and feed steers on the Chicago market for the four years, 1921-24, have been used to illustrate the story. Seasonal price variations have been quite uniform during these years. There was some fluctuation from the average in 1924, but the variations in cattle prices by seasons have been quite regular throughout these years.

A series of charts, based upon the following tables, illustrate graphically the general trend.

Table 1.-Slaughter-steer prices at Chicago,
1100-1300 pounds, average 1921-24

Month	Dollars per 100 pounds			
	Grade of steers			
	Choice and Prime	Good	Medium	Common
	\$	\$	\$	\$
January	10.88	9.74	8.52	7.12
February	10.60	9.70	8.67	7.57
March	10.38	9.64	8.63	7.56
April	10.06	9.36	8.43	7.47
May	10.06	9.39	8.54	7.77
June	10.04	9.36	8.52	7.45
July	10.40	9.66	8.61	7.26
August	10.91	9.91	8.52	6.86
September	11.10	9.94	8.30	6.50
October	11.66	10.33	8.50	6.29
November	11.70	10.30	8.36	6.07
December	11.69	10.36	8.54	6.46

Table 2.-Slaughter-and feeder-steer prices at Chicago
by grade groups, average 1921-24

Dollars per 100 pounds											
Feeder-steer prices by grade groups:Slaughter-steer prices by grade groups											
Month	750 pounds up			1100-1300 pounds							
	Fancy	Good and choice	Common and medium	Choice and prime	Good and choice	Common and medium	Choice and prime	Good and choice	Common and medium		
January	\$ 7.96	\$ 7.39	\$ 6.38	\$ 10.88	\$ 10.30	\$ 7.83					
February	8.10	7.46	6.40	10.60	10.12	8.04					
March	8.52	7.79	6.79	10.38	9.94	8.14					
April	8.48	7.80	6.71	10.06	9.67	8.01					
May	8.90	8.15	7.12	10.06	9.69	8.22					
June	8.54	7.75	6.62	10.04	9.68	7.96					
July	8.14	7.40	6.22	10.40	9.94	7.89					
August	8.10	7.28	6.00	10.91	10.30	7.70					
September	8.13	7.31	5.96	11.10	10.40	7.51					
October	7.74	7.02	5.83	11.66	10.92	7.63					
November	7.48	6.81	5.64	11.70	10.94	7.45					
December	7.52	6.88	5.76	11.69	10.98	7.66					

From the foregoing tables it may be noted that there is considerable variation in both feeder-, and slaughter- or fat-steer prices during the year. The better grades of fat steers are lowest during April, May and June, and highest during October, November and December; while the converse is true of the lower grades. In other words there is a very narrow spread between the different grades of fat steers during the spring months and a very wide spread during the fall and early winter.

Feeder prices tend to follow prices of lower grade slaughter steers; they are highest during the spring months when common steers are scarce and when there is a demand for grazing cattle. The spread between the different grades of feeders does not vary materially during the year. The low period for all feeders is during October, November and December.

The average feeding period is approximately 150 days or about 5 months. Thus with a fixed feeding period, and assuming that common feeder steers make common slaughter steers when fat and with a corresponding assumption for the other grades, approximate favorable marketing dates may be determined. In making such calculations, however, it should be remembered that the steer may often be "stepped up" in grade, that is, it is possible to make a good fat steer out of a medium feeder steer.

The term "margin" commonly called "spread" as used in the following tables, represents the difference between the price per 100 pounds paid for the feeder steer and the price per 100 pounds received for the fat bullock five months later.

Due to the grouping of feeder-steer quotations, margins are shown on a group basis, thus:

Table 3.- Margin between fancy feeder steers and choice and prime slaughter steers five months later

	Months when feeders are bought											
Choice and	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
prime slaughter-	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
er steers.	:	:	:	:	:	:	:	:	:	:	:	:
5 months later:	10.06:	10.04:	10.40:	10.91:	11.10:	11.66:	11.70:	11.69:	10.88:	10.60:	10.38:	10.06:
	:	:	:	:	:	:	:	:	:	:	:	:
Fancy feeders	7.96:	8.10:	8.52:	8.48:	8.90:	8.54:	8.14:	8.10:	8.15:	7.74:	7.48:	7.52:
	:	:	:	:	:	:	:	:	:	:	:	:
Margin	2.10:	1.94:	1.38:	2.43:	2.20:	3.12:	3.56:	3.59:	2.75:	2.86:	2.90:	2.54:

Table 4.- Margin between good and choice feeders and
good choice slaughter steers five
months later

Months when feeders are bought												
Good and choice:	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
slaughter	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
steers five	:	:	:	:	:	:	:	:	:	:	:	:
months later	:9.69:	9.63:	9.94:	10.30:	10.40:	10.32:	10.34:	10.98:	10.30:	10.12:	9.94:	9.67
Good and choice	:	:	:	:	:	:	:	:	:	:	:	:
feeders	:7.39:	7.46:	7.79:	7.80:	8.15:	7.75:	7.40:	7.23:	7.31:	7.02:	6.81:	6.88
Margin	:2.30:	2.22:	2.15:	2.50:	2.25:	3.17:	3.54:	3.70:	2.99:	3.10:	3.13:	2.79

Table 5.- Margin between common and medium feeder steers and common and medium slaughter steers five months later

	Months when feeders are bought											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Common and medium slaughter steers	\$:	\$:	\$:	\$:	\$:	\$:	\$:	\$:	\$:	\$:	\$:	\$:
5 months later	8.22:	7.36:	7.89:	7.70:	7.51:	7.63:	7.45:	7.66:	7.83:	8.04:	8.14:	8.01
Common and medium Feeders	6.38:	6.40:	6.79:	6.71:	7.12:	6.62:	6.22:	6.00:	5.96:	5.83:	5.64:	5.76
Margin	1.84:	1.56:	1.10:	.99:	.39:	1.01:	1.23:	1.66:	1.87:	2.21:	2.50:	2.25

Margins are not an infallible guide in cattle feeding operations, but in general they indicate that there is a rather definite optimum time to feed the different grades of cattle. Fancy feeders show the greatest margin when bought during June, July or August. The same months are also best for good and choice feeders but with less advantage over other months than in the case of fancy feeders. When feeding common and medium steers the greatest margins are found on feeders bought during October, November, or December and marketed during February, March, or April.

In general there are two types of cattle feeders that may be able to apply this information in their feeding operations:

- (1) The feeder whose operations are closely tied up with his general farming. He feeds during a definite period and markets his cattle in the spring when crop production begins to require most of his attention. In his case the time of feeding is fixed.
- (2) The feeder whose time of feeding is not fixed, but who finds it desirable to feed out a particular grade of steers.

In brief, the feeder whose time of feeding is fixed has the opportunity of selecting the grade of feeder steers that will give the greatest margin; and the feeder whose grade of steers is fixed has the opportunity of selecting the most profitable time or season to carry on his feeding operations.

WHAT IS THE CHEAPEST FEED? PASTURE.

The fact that "Pasture" is the answer to the question contained in the title of this exhibit can be shown in a number of ways. For example, production costs show that the average feed unit, of pastures of all kinds, costs only one-sixth as much as that of harvested feed. When costs of gains of farm animals, which are summered on pasture and wintered in the feedlot, are figured, a proportionate advantage in favor of pasture is found. An experiment in steer feeding in West Virginia illustrates this.

An average of 90 head of steers, purchased on the range at weaning time were carried three winters on cottonseed meal and silage and three summers on bluegrass pasture by the West Virginia Agricultural Experiment Station and the Department. A comparison of the relative economy of summer and winter gains shows that e a c h

p o u n d o f g a i n i n t h e f e e d -

l o t c o s t 2 4 c e n t s, w h i l e

e a c h p o u n d o f p a s t u r e g a i n

c o s t l e s s t h a n 5 c e n t s.

A brief summary of the experiment follows:

Average initial weight of steers - 386 pounds
 " final " " " -1258-1/2 "
 " total gain ----- 872-1/2 "
 " gain on pasture ----- 710-1/10 "
 " winter gain ----- 162-2/5 "

Number of days on pasture ----- 618
 " " " " winter feed ---- 370

Total cost of summer gains per steer - \$33.23
 " " " winter " " " - 39.37

Gains and Costs by Seasons:

	<u>Pounds</u>	<u>Cost</u>
First winter gain (124 days)	83.9	\$11.75
Second " " (120 ")	58.8	12.29
Third " " (126 ")	19.7	15.33
First summer gain (236 days)	114.8	7.08
Second " " (241 ")	276.4	12.05
Third " " (141 ")	318.9	14.10

In view of the importance of an abundance of succulent pasturage in livestock production, farmers are finding that it pays to give their pastures careful attention throughout the year. Most permanent pastures are only grazed half as much as they should be for best results. Light pasturing allows weeds and other undesirable vegetation a favorable advantage over bluegrass and other pasture grasses. When bluegrass is shaded by weeds it does not grow well; when it is allowed to mature it assumes a dormant stage and is not readily eaten by livestock. Experiments have shown that close or heavy pasturing gives twice the gains in growing animals as does the light pasturing practiced on many farms. As a rule, therefore, the practice of maintaining

reserve pastures is not advisable as the animals much prefer young grass.

Phosphorus in some form is the only commercial fertilizer that has been found to pay the farmer for its cost. It increases the growth of white clover very greatly.

Bluegrass and white clover are the two great pasture plants of the Northern States; Bermuda, carpet grass and lespedeza do best in the South.

Pastures for fattening livestock should consist of legumes or of annual grasses.

By way of graphically emphasizing the contrasting results obtained by the right and wrong methods of pasturing, two plots of grass are represented in the foreground of this exhibit. In one, close pasturing has kept the grasses tame. In the other, lack of sufficient grazing has let them grow up "wild."

Hanging on the fence surrounding these plots is a placard containing a portion of John J. Ingalls' famous tribute to grass, as follows:

Grass

"Grass is the forgiveness of Nature - her constant benediction. Fields trampled with battle, saturated with blood, torn with the ruts of cannon, grow green again with grass, and carnage is forgotten. Streets abandoned by traffic become grass-grown like

rural lanes, and are obliterated; forests decay, harvests perish, flowers vanish, but grass is immortal. Beleaguered by the sullen hosts of winter, it withdraws into the impregnable fortress of its subterranean vitality and emerges upon the solicitation of spring. Sown by the winds, by wandering birds, propagated by the subtle horticulture of the elements, which are its ministers and servants, it softens the rude outline of the world. Its tenacious fibers hold the earth in its place, and prevent its soluble components from washing into sea. It invades the solitude of deserts, climbs the inaccessible slopes and forbidding pinnacles of mountains, modifies climate and determines the history, character and destiny of nations. Unobtrusive and patient, it has immortal vigor and aggression. Banished from the thoroughfare, or the field, it bides its time to return, and when vigilance is relaxed, or the dynasty has perished, it silently resumes its throne, from which it has been expelled but which it never abdicates. It bears no blazonry of bloom to charm the senses with fragrance or splendor, but its homely hue is more enchanting than the lily or the rose. It yields no fruit in earth or air, and yet should its harvest fail for a single year, famine would depopulate the world."

OUR YEAR ROUND LAMB SUPPLY.

When do you market your lambs,
and
who are your competitors?

A study of the origin and seasonal movement of sheep and lambs to market should be interesting to the consumer as well as advantageous to the producer. While this exhibit is largely instructive, it may give the sheepman some basis for adjusting his production and marketing policies. It is remarkable, when one stops to think about it, how the supplies from various sheep and lamb producing areas dove-tail into our total year-round supply and how uniformly the seasonal lamb crop is distributed to the consumer.

It might be well to state before going further that the composition of the ovine stock slaughter is approximately 88 per cent lambs and yearlings, and 12 per cent sheep. However, market receipts should show a slightly higher proportion of lambs and yearlings due to the number of feeder lambs that go back to the country for feeding.

This country is divided into well-defined lamb-producing areas, which may be further divided according to the kind of lambs produced and the season of marketing. The following detail table shows the seasonal movement of sheep and lambs by States of origin during 1923:

State Origin and Seasonal Movement of Sheep and Lamb Receipts
at the Principal Livestock Markets.

1923 Figures Rounded

State	Period									
	Jan. & Feb.	Mar. & Apr.	May & June	July & Aug.	Sept. & Oct.	October	November & December	November & December	November & December	November & December
Arizona	0	10,000:	27,000:	2,000:	33,000:	15,000				
Arkansas	2,000:	0	2,000:	10,000:	6,000:	3,000				
California	0	45,000:	239,000:	22,000:	10,000:	0				
Colorado	646,000:	1,012,000:	159,000:	60,000:	537,000:	255,000				
Idaho	107,000:	39,000:	66,000:	646,000:	485,000:	88,000				
Illinois	86,000:	31,000:	75,000:	76,000:	70,000:	132,000				
Indiana	53,000:	36,000:	97,000:	108,000:	98,000:	124,000				
Iowa	138,000:	42,000:	53,000:	94,000:	124,000:	249,000				
Kansas	123,000:	53,000:	70,000:	55,000:	63,000:	65,000				
Kentucky	3,000:	5,000:	239,000:	257,000:	45,000:	10,000				
Michigan	122,000:	149,000:	70,000:	29,000:	131,000:	249,000				
Minnesota	33,000:	6,000:	6,000:	33,000:	90,000:	52,000				
Missouri	107,000:	55,000:	221,000:	189,000:	111,000:	138,000				

Montana	:	38,000:	37,000:	3,000:	20,000:	275,000:	87,000
Nebraska	:	377,000:	402,000:	147,000:	72,000:	124,000:	239,000
Nevada	:	1,000:	0 :	3,000:	34,000:	132,000:	11,000
New Mexico	:	11,000:	12,000:	6,000:	4,000:	176,000:	104,000
New York	:	27,000:	37,000:	14,000:	9,000:	36,000:	43,000
North Dakota	:	11,000:	3,000:	0 :	3,000:	51,000:	48,000
Ohio	:	93,000:	126,000:	105,000:	96,000:	143,000:	181,000
Oklahoma	:	4,000:	3,000:	4,000:	10,000:	8,000:	4,000
Oregon	:	14,000:	12,000:	60,000:	152,000:	178,000:	18,000
Pennsylvania	:	4,000:	3,000:	5,000:	17,000:	25,000:	20,000
South Dakota	:	45,000:	20,000:	6,000:	12,000:	88,000:	72,000
Tennessee	:	2,000:	4,000:	119,000:	37,000:	6,000:	3,000
Texas	:	31,000:	36,000:	269,000:	194,000:	317,000:	102,000
Utah	:	44,000:	35,000:	9,000:	16,000:	351,000:	35,000
Virginia	:	0 :	0 :	45,000:	55,000:	12,000:	8,000
Washington	:	10,000:	5,000:	9,000:	64,000:	135,000:	28,000
West Virginia	:	0 :	0 :	7,000:	44,000:	50,000:	18,000
Wisconsin	:	32,000:	20,000:	9,000:	31,000:	75,000:	71,000
Wyoming	:	38,000:	24,000:	9,000:	39,000:	436,000:	50,000

Per cent	:	14.0 :	14.0 :	13.3 :	15.4 :	27.7 :	15.6
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From the foregoing table it may be noted that during each two-month period the origin of sheep and lamb supplies is largely from certain producing areas. In brief, the origin and make-up of the seasonal supplies are as follows:

January and February: Supplies during these two months consist largely of fed lambs from Colorado, Nebraska and the Corn Belt, also a large number from Michigan and the North Mountain States.

March and April: Colorado and Nebraska continue to be the chief contributors of late fed lambs during these two months. Ohio and Michigan are also important sources of supplies.

May and June: Supplies during this period are mainly spring lambs from California, Missouri, Kentucky and Tennessee, and grass-fat sheep from Texas. Colorado and Nebraska furnish a large number of late fed lambs during May.

July and August: Supplies during July and August are practically all killing lambs from the Corn Belt, Kentucky, the Virginias and such Western States as Idaho, Oregon and Washington.

September and October: This period or season brings the heaviest receipts, due to the large number of feeder lambs from Western States. The West is a heavy contributor of killing lambs as is the Corn Belt.

During these two months approximately one-third of the market receipts are returned to the country for feeding.

November and December: The supply of killing lambs during November and December consists largely of fed western lambs, used to clean up farm roughage and fattened in corn fields, and late native lambs. November brings the range movement to a close. Most of the offerings at that time are feeders.

Native lambs, largely because of parasitic infection, usually are not satisfactory feeding animals. Hence more native lambs go direct to killers. Western lambs are satisfactory for feeding and approximately 50 per cent go as feeders, being purchased either at stock yards or direct from growers.

The practice of feeding lambs aids materially in the seasonal distribution of the crop. Approximately one-third of the market receipts of lambs during September and October are returned to feed lots and later return as fat lambs during the early part of the following year. If all lambs went direct to killers, the supply would be excessive at some seasons of the year.

Lambs are a seasonal crop. Fully 90 per cent are dropped during March, April and May, and, in contrast, the inspected slaughter of sheep and lambs is even throughout the year, varying from 7.3 per cent in February to 9.4 per cent in October - hence our uniform lamb supply.

GOOD WOOL

The production of good wool requires the right kind of sheep breeding, feeding and management. This exhibit shows two fleeces of wool just as they came from the sheep's back. At the spectator's left is a ten-pound fleece of good wool. Directly below this good fleece will be seen a good ewe that is growing choice wool of this kind. Just above this fleece is a jar containing 5.8 pounds of grease and dirt which is the approximate amount of grease and dirt in this good fleece. Beside this jar is 4.2 pounds of good scoured wool, the weight of clean wool that would be secured from this ten-pound fleece. At the other side of this exhibit is a seven-pound fleece of inferior wool shown over the pen that contains a type of ewe on which such wool is growing. Immediately above this inferior fleece is shown 2.5 pounds of clean, short, inferior wool and 4.5 pounds of grease and dirt, which are about the amounts of these materials that would come from this fleece.

From these figures it will be seen that the good fleece would have a scouring shrinkage of 58 per cent and the inferior fleece slightly more than 64 per cent. The long staple, strong wool in the good fleece is the kind required for the best durable worsted cloth. On the July, 1925, Boston market this choice wool was worth \$1.40 per pound on a clean basis or 58.8 cents per pound unscoured. This good fleece would therefore be worth \$5.88. The inferior fleece contains short, weak fibers not suitable for the manufacture of the most durable clothing

and for this reason wool of this kind is not so much in demand as the wool in the good fleece. When the good wool was worth \$1.40 a pound scoured, this short, weak wool was selling on the same market for about \$1.20 a pound clean, or slightly less than 43 cents a pound in the grease. Thus, the inferior fleece would be worth only \$3.00 or \$2.83 less than the good fleece. This difference may seem rather small but on a band of 1,000 ewes it would amount to \$2880 or the cost of hiring about three or four good sheep herders for a year.

When breeding for good wool:

- (1) Use good purebred rams that shear heavy fleece of choice wool.
- (2) Cull the ewes that shear light fleeces of inferior wool.
- (3) Avoid frequent changes in breeds.

When feeding for good wool:

- (1) Provide plenty of palatable and nutritious grazing.
- (2) Keep ewes gaining during the winter when good grazing is not available, by feeding good legume hay.
- (3) Insure strength of fiber by avoiding periods of starvation.
- (4) Change rations gradually, especially when starting on grain feeding.

When managing for good wool:

- (1) Shear the sheep on a clean, well-swept floor.

- (2) Avoid second cuts when shearing.
- (3) Roll fleeces clean side out and tie with paper twine.
- (4) Store the wool in a clean, dry place.
- (5) Brand sheep with paint that will scour.
- (6) Guard against foreign material such as burrs, chaff, etc., getting into the wool.

TWO METHODS OF FEEDING LAMBS

Legume hay is one of the most important essentials for profitable lamb feeding. When it is properly fed with corn to fattening lambs of the right kind it should result in satisfactory profits under the normal market conditions. Non-legume hay (such as timothy and prairie hay) is unsatisfactory for lamb feeding and when fed with corn usually results in very small profits or actual losses.

The exhibit "Two Methods of Feeding Lambs" shows the average results of experiments conducted by the State Experiment Stations of Indiana, Nebraska and Wyoming in which a ration of legume hay and corn was compared with non-legume hay and corn for lambs averaging an initial weight of about 60 pounds. The average feeding period for these lambs was approximately 80 days during which time the lambs fed legume hay and corn gained about 25 pounds and those fed non-legume hay and corn gained only 15 pounds.

The prices of lambs and feeds reported in this exhibit are considered fairly representative of normal prices. During 1925 we have ex-

perienced lamb prices somewhat higher than normal. The average price of 8-1/3 cents for 60 pound feeder lambs or \$5.00 per lamb would seem very low this fall but it is the price used in this instance because it is considered more nearly what can be expected over a period of several years. The general comparison between legume and non-legume hays is in no way interfered with by these feeder-lamb prices since the feeder lambs in both lots were of the same value at the beginning of the feeding period.

In calculating the cost of the feeds hay was figured at \$15.00 per ton and shelled corn at \$1.12 per bushel. This made the feed cost \$2.35 per lamb for those fed legume hay and corn, while it was \$2.11 for the lambs fed non-legume hay and corn.

The live weight selling prices of 12 cents and 9 cents respectively for legume and non-legume fed lambs are representative of the spread for these different qualities of lambs experienced by the United States Department of Agriculture when selling several hundred of its experimental lambs in the fall of 1924. It should be understood that these selling prices are for slaughter lambs. On this basis the lambs fed legume hay and corn yielded a profit of \$639.05 per carload of 225 lambs, or \$2.84 per lamb, while the lambs fed timothy or prairie hay with corn lost \$80.10 per carload of 225 lambs or about 36 cents per lamb. The lambs in the accompanying pens illustrate these results.

The "best lamb-fattening ration" in this booth was worked out by Purdue University Agricultural Experiment Station at Lafayette, Indiana.

This institution has conducted lamb feeding experiments for 15 consecutive years during which time more than 4000 lambs were fed in testing 40 rations. All conclusions from the results of these lamb-feeding investigations are based on three or more trials. These results prove the following facts:

- (1) Corn is the best grain to feed fattening lambs.
- (2) Corn silage reduces costs.
- (3) Cottonseed meal increases profits.
- (4) A legume hay is essential to most profitable gains.
- (5) The best lamb fattening ration is:

Corn seven parts
Cottonseed meal one part
Clover hay
Corn silage

In feeding this ration the shelled corn and cottonseed meal should be mixed together and the lambs should be fed all of this mixture that they will clean up by the time they leave the trough. The silage should be fed after the concentrates in amounts that will be cleaned up in about one hour. The lambs should receive all the clover hay they will clean up before the next feeding time. The entire ration should be fed twice daily.

In 1924 Purdue University Agricultural Experiment Station fed a carload of range lambs on this ration and upon exhibiting them at the International Live Stock Exposition won first prize for range-bred lambs. The transparency in the central part of this booth shows a photograph of this carload of lambs.

THE MARKET MEASURE OF LAMBS

The market sits in judgment on the efforts of the lamb producer and quickly decides whether those efforts have been in line with market requirements. The breeder and feeder may have produced a lamb wholly to their own liking but if the lamb does not come up to specifications laid down by the market, the breeder and feeder cannot hope to obtain either the top price or the maximum profit from their labors.

The market has a system of measuring the desirability of lambs and as a rule pays for them on the basis of the degrees of excellence possessed. In other words, grade is the thing which usually determines whether a lamb shall sell at the top or the bottom of the price range. Grade is made up of three factors - conformation, finish and quality.

In conformation a choice grade lamb is blocky and compact, with a broad back, full loins and short, plump legs and neck.

With respect to finish, such a lamb has a smooth covering of fat which is well distributed over the body and which is firm to the touch but at the same time possesses elasticity or resilience.

The quality of such a lamb is high and is indicated by a clean-cut head, fine strong bones, firm flesh and a comparatively light pelt without folds or wrinkles.

Two choice grade lambs are shown in the exhibit, one in full fleece and the other shorn. A large illustration of a choice grade lamb carcass is

also shown. It necessarily follows that in slaughter lambs a choice-grade lamb must produce a choice-grade carcass and the description of a choice-grade lamb just given applies with equal force to a carcass of the same grade. The fleece frequently conceals a multitude of defects and obviously in slaughter lambs everyone is interested in that which is under the fleece and under the pelt. Hence the exhibit shows a lamb with the fleece on, a lamb of the same grade with the fleece off and finally a bromide of the carcass with the pelt off.

In another pen appear two common-grade slaughter lambs, one in fleece and the other shorn, and nearby is an illustration of a common-grade lamb carcass. As is true of all market lambs, common grade animals are judged on the basis of conformation, finish and quality. A common grade lamb is rough, rangy and angular in conformation. Bones are prominent, flesh is thin and shallow, and legs and neck are usually long and thin.

In the matter of finish such lambs show a decided scarcity of fat covering. The little fat present lacks mellowness and resilience or "springiness" to the touch. Furthermore, partly due to the lack of fat, the neck, breast and flank are thin and decidedly lacking in fullness.

With respect to quality, common grade lambs are generally coarse in appearance, the bones as a rule are relatively heavy and the pelt is heavy and likely to be wrinkled.

The contrast between the two grades is very striking both in the live lambs and in the dressed carcasses. It is this contrast in grade factors which the market considers of prime importance. It constitutes the estimate which the market places upon the lambs. This might be a matter of little consequence to the producer were it not for the fact that the market expresses its approval or disapproval in terms of price paid the producer.

This is illustrated forcibly in the exhibit, which shows that the average price of choice grade lambs at Chicago during October, 1925 was \$15.45 per 100 pounds, whereas the average price of common grade lambs for the same month was \$12.50. Carrying the comparison into the dressed meat the average price of choice grade dressed lambs at Chicago during October was \$27.50 per 100 pounds, and that of common-grade dressed lamb \$19.70 per 100 pounds. In other words, during that month choice-grade live lambs averaged \$3.15 higher than common-grade lambs and choice-grade dressed lamb averaged \$7.80 per 100 pounds higher than common grade.

That was the decision of the market regarding the relative desirability of the two grades and that was final. A producer may not agree with a decision which the market renders but that does not alter the case. The market is the court of last resort. Its decisions are final and there is no appeal.

LAMB AS YOU LIKE IT.

"Lamb as You Like It" whether roasted, broiled, stewed, or braised, is the last link in the chain of exhibits on the production, marketing and utilization of lamb. Three tempting ways of using the choice cuts of lamb are displayed on one table and three equally tempting dishes made from the less expensive cuts are on the other table. The choice cuts exhibited are roast leg of lamb, broiled lamb chops, and "crown rib roast." The panel just behind these choice cuts gives suggestions for their preparation:

"Sear quickly on all sides, using intense heat.

Reduce heat and cook through more slowly without liquid.

Serve hot, with mint sauce, currant jelly, or other highly flavored relish."

More specific directions are found on page 7 of Farmers' Bulletin 1324, "Lamb and Mutton and Their Use in the Diet."

The crown roast is worthy of special mention. This roast is made from two strips of rib chops bent back and sewed together to form the shape of a crown. Any butcher will trim and shape lamb rack for such a roast. The meat on the ends of the ribs is trimmed off because it tends to dry out and become unpalatable in roasting. If the trimmings of meat and fat are ground they may be formed into a mound and roasted in the cavity of the "crown." It is well to protect the ends of

the scraped bones with small cubes of fat or with cubes of bread so they will not be charred by the intense heat of the oven. When the crown roast is done, the cavity is filled with creamy mashed potatoes, the rib ends are protected with fresh cubes of bread, and the roast is returned to the oven until the potatoes and bread are a golden brown.

The less expensive though generally pleasing dishes on the second table are lamb stew, braised breast of lamb, and stuffed lamb shoulder. Since these dishes are prepared from the more exercised and therefore tougher portions of the carcass, they require different treatment in cooking as explained in the panel:

"PREPARING THE LESS EXPENSIVE CUTS."

"Rub in seasonings and flour, sear to retain juices. Cook slowly until tender, surrounded by hot water or steam. Use vegetable stuffing, bread dressing, or sliced vegetables for pleasing variety."

Farmers' Bulletin 1324, on pages 9 and 10, contains recipes for stuffed shoulder, brown stew, and braised breast of lamb. The spinach dressing folded into the breast of lamb was made as follows:

Spinach Dressing.

2 cups of dried bread crumbs
1/2 pound of uncooked spinach, washed thoroughly
4 tablespoonfuls of butter
2 tablespoonfuls of chopped celery
1 tablespoonful of chopped green pepper
1 tablespoonful of chopped onion
3/4 teaspoonful of salt
1/4 teaspoonful of pepper

Cut spinach in small pieces, mix with chopped celery, green pepper, and onion, and cook in a frying pan with half of the butter. Push to one side of the pan and add the rest of the butter. When melted, add bread crumbs and mix thoroughly. Then stir all ingredients until the mixture is fairly dry and well blended.

The fat of lamb has a characteristic flavor which is not palatable to everyone. For this reason such accompaniments as the following are very pleasing with lamb and mutton.

Tart Jellies:

Currant
Mint
Barberry

Tempting Sauces:

Mint
Parsley
Caper
Tomato
Horseradish
Spanish.

Tasty Seasonings:

Celery seed
Bay leaf
Curry powder
Nutmeg
Allspice
Cayenne pepper
Lemon juice
Minced onion
Chopped pickle
Minced green peppers

Retail lamb prices on the Chicago market are shown for each of the seven different cuts of lamb discussed in the exhibit. They illustrate forcibly that the various portions of a lamb carcass adapt themselves to a wide range of family purses. The frugal housewife who wishes to spend but half a dollar for the meat portion of her family's dinner, may feed five or six very comfortably and sumptuously on braised breast of lamb. On the other hand, if the price is a secondary consideration, a half dollar may be exchanged for two choice rib chops which will make a broiled dish "fit for a King."

BEEF, AT THE MARKET AND IN THE KITCHEN

A pen-and-ink drawing was reproduced some time ago in one of our livestock journals published daily in the Middle West. It showed a modern lady shopper standing before a butcher's display counter upon which were arranged a round, loin end, rib cut, and fore shank of beef, each properly labeled with its name. With her fingers on her purse strings and a look of bewilderment she was represented as exclaiming, "It's all just meat to me!!! " Below this cartoon the reader was reminded that this same lady has no difficulty in remembering such "staple" dry goods names as Charmeen, Kasha, Twill, Jeweltone, Kashlera, Twillbloom, et cetera. The title of the cartoon was, "ISN'T IT ODD?"

Undoubtedly, the situation portrayed in this drawing is closely akin to the truth of the

matter. But housewives and others whose business it is to select the meat for our tables are showing an eagerness to become better acquainted with the different cuts of meat, their comparative values and the proper methods of cooking for each. This exhibit of the Department represents an effort to aid in supplying that information.

The new poster, "DO YOU KNOW GOOD BEEF?" attempts to acquaint the public with the characteristic appearance of both choice and common beef. The latter has its place in the American diet, but it should be recognized for what it is worth and given culinary preparation accordingly.

Most folk know the difference between a porterhouse and a round steak, but too few are aware of the difference between a "choice" porterhouse and a "common" porterhouse, or between a "choice" round and a "common" round. There is as wide a variation between a "choice" and a "common" porterhouse as between steaks cut from various parts of the same carcass. To bear out this fact two chucks, one "choice" and one "common" are shown in the exhibit side by side.

"Choice" is a trade name assigned to beef which is tender and juicy. "Common" is applied to beef which contains a large amount of tough connective tissue or "reinforcing;" it lacks both fat and juiciness. Choice beef is the result of careful breeding and feeding methods. Common beef comes from cattle that have been less fortunate.

Choice beef has an abundance of white, firm fat, a bright attractive red color in the lean and is firm and dry, yet velvety to the touch. Common beef has a scanty covering of dark or yellowish fat, a dark or blackish-red lean, and is soft, wet, and glistening. These differences are the signs by which the housewife can determine the character of the meat purchased, and knowing this, can decide upon the proper cooking method.

If the following methods of cooking are applied to cuts of beef of various grades, the fact will be demonstrated that the beef which lends itself to broiling or roasting must carry quality, and that a palatable, nutritious dish having very different characteristics may be produced from the cheaper cuts. The problem of serving a suitable meat dish lies not so much in the kind of meat bought as in knowing its quality and in choosing a suitable method of cooking.

Broiling:

The chucks exhibited are divided into steaks and roasts typical of the cuts which would be sold over the butcher's block. The placards offer suggestions for the cooking of meat according to the grade purchased. A cut from a choice chuck may be prepared as a broiled steak, an oven roast, or a braised oven roast. A steak may be broiled in a oven under a gas flame or electric plate, in a wire broiler over a bed of hot coals, or in a pan over a hot fire. The object of broiling is to seal up the juices or flavoring material, and to retain the tenderness of the steak by rapid cooking. In pan broiling, the pan is heated very hot and is greased over lightly

by wiping with a piece of suet, so that the meat will not stick. Using a large amount of grease toughens the outside of the steak and does not increase the juiciness of the inside. The steak is placed in the hot pan and seared first on one side, and then on the other quickly. After the steak is seared, the heat is reduced and the broiling proceeds more slowly. The meat must be turned frequently to prevent burning. Care should be taken not to pierce the crust which has formed lest the juice leak out.

Roasting:

True roasting is a method similar to broiling because a high temperature is used in each case to sear over the outside and no moisture is added during any of the cooking. Only a cut which is choice, juicy, tender, and containing well-distributed fat, should be roasted. It is desirable to use an uncovered roaster so that there will be no steam formed to soften the crust and wash out the juices. The retaining of juices in the roast is at the expense of rich, brown gravy. Some people prefer to sacrifice a little flavor and juiciness in the meat in order to develop more gravy. This is accomplished by pouring a small amount of water in the bottom of the roaster under the rack and covering the roast closely after it is seared. Such a method is described as "oven braising." Care should be taken that only a small amount of water is added so that the roast is not bathed in the liquid.

Cooking With Moisture:

Cuts from common chuck cannot be made tender without the addition of a larger quantity of water. It takes a steady simmer to make the coarse, dry fibers of common beef tender and palatable. For this reason, it is suggested that the common chuck be prepared as a smothered steak, a Swiss steak, a pot roast, or a brown stew. These dishes contain plenty of rich gravy flavored with the juices drawn from the meat. The cut to be prepared as a smothered or Swiss steak should be from 1-1/2 to 2 inches thick. Seasonings are rubbed into the meat, it is floured well, and a crust is formed by searing the meat in hot fat. Many people like to brown onions in the fat in which the steak is seared. After the crust is formed, hot water is poured around the steak to "smother" it, and the cooking is continued over a slow fire, preferably in an iron skillet, tightly covered. Swiss steak differs from smothered steak in that stewed tomatoes or strained tomato juice are substituted for the hot water.

The pot roast and piece for brown stew are usually cut thicker than the steaks described above. The method of cooking is similar. Sliced vegetables are often added to the stew.

DISINFECTION.

The widespread distribution of disease germs and resulting losses among farm animals, make it worth while for the livestock farmer to become acquainted with some of the more common disinfectants and their uses. When disease germs are present on the premises, general cleaning up will not destroy them. Disinfection must be resorted to.

Fire is the safest, and oftentimes the most convenient disinfectant. The bodies of animals dead from disease should either be burned or buried deep with quicklime. All contaminated bedding, manure, body discharges and other material not easily disinfected by the use of chemicals should also be burned.

Some general rules for disinfection are pointed out in the exhibit as follows:

How to Disinfect:

1. First remove all litter and other free matter and burn it.
2. Thoroughly clean all exposed surfaces with a broom or brush, after dampening, if dry, to lay the dust.
3. Remove accumulations of manure and other filth from cracks and crevices of walls and floors, until fresh surfaces are exposed. If floors are earth, take off several inches.

4. Completely soak floors, walls, etc., with an efficient disinfecting solution, using a force pump if possible.
5. Keep quarters free from animals for several days after disinfection, and allow sunlight and fresh air to have free access.

Common Disinfectants:

Some common disinfectants with directions for their mixture and use are given as follows:

Compound solution of cresol, U.S.P.: Mixes readily with water and in solutions of 3-1/2 per cent to 4 per cent is an efficient disinfectant.

Bichloride of mercury (Corrosive sublimate): Dissolve in water to a strength of 1 to 1,000. A dangerous poison, corrodes metal, and should be used with great care.

Carbolic acid, chemically pure (phenol): 5 per cent solutions in water are efficient. Very poisonous and more expensive than most other disinfectants.

Cresol: A 2 per cent solution in warm water is very effective.

Emulsified coal-tar products (dips): Widely distributed on the market under a variety of trade names. Precaution should be taken to see that the package carries an official approval label. Follow instructions on container.

Quicklime: A cheap and good disinfectant. Mix 1 pint of water with each 2 pounds of quicklime

and then add 4 times the volume of water. Useful for scattering about yards and interiors of buildings.

Formaldehyde: Commonly used in the form of formalin solution of 40 per cent strength. Use 6 ounces to each gallon of water for disinfecting hay, grain, or other contaminated feed. Also, use in the gaseous form to fumigate buildings which can be made air-tight. The gas is liberated by adding formalin to crystallized or powdered permanganate of potash in a wide surfaced, non-combustible container. Use 16-2/3 ounces of potash to 20 ounces of formalin.

Chloride of lime: Six ounces of this mixed with 1 gallon of water makes a fairly good disinfectant and a powerful deodorant.

Detailed instructions for the use of these disinfectants are contained in Farmers' Bulletin 926, "Some Common Disinfectants."

HOG CHOLERA CONTROL

Hog cholera destroys more hogs in the United States than all other diseases combined. It has taken a toll of \$73,000,000 from American farmers in a single year and still collects from 20 to 30 million dollars annually.

Many of the ways in which hog cholera is carried from farm to farm can be avoided by the exercise of proper care. Sanitation,

disinfection, and self-imposed quarantine are important. The Federal Bureau of Animal Industry has made a study of the disease and finally developed anti-hog-cholera serum, which is the only known reliable preventive agent. The simultaneous inoculation of hog-cholera virus and this serum enables the hog to acquire immunity against cholera.

Cholera attacks strong and healthy hogs as well as weak ones. Therefore, it is safe to suspect cholera when hogs first show signs of sickness.

Inasmuch as no cure has been found for hog cholera, the proverbial "ounce of prevention" is worth its weight in gold against this destructive disease. Two safe rules are to keep

the premises clean and

immunize at once if the

disease threatens.

New hogs should not be added to the herd until they have been watched in quarantine for 3 weeks. During an outbreak, in fact, a strict quarantine should be enforced on the whole farm. All dogs and other roving animals in the community should be confined. Non-immune hogs should be kept away from the streams, roads, and line fences. All dead hogs and viscera from butchered animals should be burned or buried deep and covered with quick lime. Stock cars and stock yards which have been occupied by hogs should be disinfected before again being used. It

never pays to ship sick hogs to market as many die en route or after arrival, and is one of the principal ways by which the infection is spread.

If the sow is immune from cholera her pigs will be safe as long as they are suckling. If not, both sow and litter should be vaccinated if cholera threatens. And inasmuch as little pigs from immune sows lose their natural immunity as they grow older, it is often the part of wisdom to protect them with the simultaneous treatment.

Every hog raiser should read a copy of Farmers' Bulletin No. 834, entitled "Hog Cholera," or a bulletin on the same subject published by his State agricultural college.

TUBERCULOSIS ERADICATION

The eradication of tuberculosis of livestock has been making remarkable strides in the United States during the comparatively brief period of 8 years during which it has been in progress. In 1917 there were but a few States that by law were prepared to cope with the tuberculosis situation. They were without funds to carry on eradication work. During the fiscal year which closed June 30, 1925, more than 7,000,000 cattle were tuberculin-tested, an increase of nearly 2,000,000 over the previous year. Today every one of the 48 States is provided with funds for this splendid work, and a total of approximately 12,000,000 cattle are under supervision.

There are two plans of procedure used in combatting this disease by Federal, State, and

local agencies, cooperating. They are the accredited herd plan and the area plan. The latter plan has gradually gained ascendancy because stock-owners see in it a possibility of cleaning up not only their own herds but also all the herds around them, thus diminishing the danger of reinfection.

The Area Plan: The area plan contemplates testing every bovine animal on every farm in a county in which it is put in operation, to dispose of the reactors by slaughter, to clean and disinfect the premises from which the reactors were removed, and to go back as many times as is necessary to retest those infected herds until they are known to be free. It then contemplates protecting the area against outside infection by quarantine regulations. A total of 650 counties are now engaged in area work, and

104 counties in 19 States

have now been declared

modified accredited areas.

The area becomes advertised as the home of healthy cattle; and cattle from such areas may be shipped without retest for three years.

The Accredited Herd Plan:

This plan consists in testing all cattle in an individual herd until all animals composing it have passed two successive annual or three successive semi-annual tests and physical examinations; then maintaining the herd under sanitary conditions and protecting it against outside reinfection. To date there are more than 70,000 accredited herds

in the United States containing a million and a third cattle.

Cattle from accredited herds command higher prices and the owner of the herd is assured that economic losses caused by the disease have been eliminated.

Farmers' Bulletin No. 1069, "Tuberculosis in Livestock", describes in detail successful methods of detection, control and eradication of the disease.

ROUNDWORM CONTROL

Roundworm infestation and other filth-borne diseases are costing the hog-producing industry heavy annual losses. The roundworm causes digestive troubles, retards growth and development, and in other ways interferes with the well-being of hogs, especially the younger animals. The infected pig often shows symptoms commonly known as thumps, and may die of pneumonia.

Investigation has shown that pigs are most susceptible to infection and suffer most seriously from the infection during the first few weeks of life. As they grow older they become more resistant. Pigs become infected by swallowing the eggs of the parasite which are of microscopic size and are found in the manure of infested hogs or upon and in the soil of places that have been occupied by infested hogs.

In McLean County, Illinois, a system of swine sanitation was developed by the United

States Department of Agriculture under field conditions that has shown how to avoid entirely or reduce to the minimum these losses. The method is simple and quite inexpensive as compared with the savings effected,

The Plan:

1. Thoroughly clean farrowing house, removing all litter and scrubbing floor and walls with boiling water and lye.
2. Wash sows with soap and water before placing them in cleaned house.
3. Within two weeks after farrowing remove sow and pigs directly to a field which has been plowed and seeded to pasture since occupied by hogs.
4. Allow no other hogs in this pasture.
5. Keep pigs on this pasture until four months old, when they are past greatest danger.
6. Plow hog yards and lots each year and plant crops so as to destroy roundworm eggs.

An illustrated chart entitled, "The Roundworm's Journey through the Pig," shows the life cycle of this parasite.

The Department has available for distribution a mimeographed pamphlet entitled, "The Prevention of Intestinal Worms in Pigs," which discusses the McLean County system more in detail than was possible in the exhibit.

STOMACH WORMS OF SHEEP.

One of the most serious problems of owners of farm sheep is the prevention of injury and loss by stomach worms. This parasite is most plentiful in the South, where it is favored by abundance of warmth and moisture, but it is quite a common and serious pest in the Middle West and in low, wet areas throughout the entire country. It is present in smaller numbers and does less damage in the high, dry, and cool areas of the Rocky Mountain States.

The first things noticed about infested sheep are dullness and lack of thrift. Diarrhea may be present. Later, more characteristic features of the disease become evident such as paleness of the skin, known as "paper skin", and swelling under the jaw, called "poverty jaw". Stomach worms prevent proper growth and development, cause weakness and death. They are particularly destructive to lambs.

The exhibit presents a brief account of the life history of this parasite to show how sheep are infected:

How Stomach Worms Infect Sheep:

1. Wormy sheep scatter worm eggs in their droppings.
2. Young worms hatch from the eggs.
3. Worms in the infective stage crawl up blades of grass.
4. Sheep eat the worms with the grass.
5. Young worms mature in the sheep and produce more worms.

Bluestone Treatment:

A satisfactory treatment for this disease is the use of a solution of copper sulphate in water, known as the "bluestone treatment."

How to prepare it: For dosing 100 sheep, dissolve $1\frac{1}{4}$ pound of clear blue crystals of copper sulphate in 1 pint of boiling water; then add cold water to make 3 gallons. Mix and keep in porcelain or enamel container.

When to give it: Once every 3 or 4 weeks from spring through fall; or throughout the year in the South.

How to give it:

Dosage - For grown sheep, 3 ounces of solution
For lambs, $1\frac{1}{2}$ ounces of solution.

Have the animal standing on all four feet while being dosed. Then pour the solution slowing into its mouth through a funnel and rubber tube or from a long-necked bottle.

Prevention:

Preventive measures with this, as with other diseases, are always best. The first essential is to protect the lambs. They are more likely to become infested than sheep; and to suffer more afterwards. Therefore, the safest pasture should be furnished to the lambs, the older sheep taking the more dangerous pasture, where it is necessary for sheep to go back to old pasture within a year. Hillside pastures are likely to be safer than bottom land.

Plowing is a means by which infestation may be controlled; then the plowed land may be sown to forage crops and the sheep turned on these crops with safety.

Careful rotation of pastures and the blue-stone treatment together usually prove adequate control stomach worms.

Detailed discussion of this and other parasitic diseases of sheep can be found in Farmers' Bulletin No. 1330.

TICK ERADICATION.

Tick fever, a very serious obstacle to the cattle industry of the South, is transmitted solely by the cattle tick. In 1906 this parasite was distributed over the larger portion of 15 Southern States from California to Virginia, a total of 975 counties being infested. By co-operative and systematic eradication work conducted by the States, counties, other local organizations and the United States Department of Agriculture, the tick-infested area under quarantine has been reduced to 275 counties in 10 States. A total of 700 counties, therefore, have been released from quarantine, 550 of which have been entirely freed of ticks.

This steady eradication of the cattle tick has been of tremendous benefit to the cattle industry of the South. The continuous sucking of the animal's blood by the tick greatly

reduces its production of milk or beef, spoils its hide for making good leather, and often results in the death of the animal. Moreover, cattle from an infected district always are penalized at the markets.

The most important economic aspect of the tick problem, however, has been that it prevented Southern breeders from improving their herds by importing breeding stock from tick-free areas. Animals from such areas are nonimmune and prove easy prey to the ravages of tick fever.

Already, several sections of the South which have been freed from this parasite have produced and shown grand championship animals at the International Live Stock Exposition and others of our great stock shows.

When all cattle of an infected area are dipped in an arsenical solution regularly every 14 days for a period of a few months, the eradication of the tick is accomplished. It is a safe and sure method that has been tried under all sorts of adverse conditions. It depends for its success mainly upon the careful vigilance and whole-hearted cooperation of all stock-owners in a locality to see that there are no "strays" on dipping day. The story of the vicissitudes of the progress of this campaign forms a stirring chapter in our livestock history.

BLACKLEG PREVENTION.

Blackleg is a rapidly fatal, infectious disease which attacks cattle of all ages, but especially those 6 to 18 months old, and occasionally sheep, goats and hogs. Outbreaks occur most often in the spring and fall. The disease generally is confined to certain areas where the soil contains the germs of the disease.

Symptoms:

The disease is characterized by high fever and the formation under the skin of gaseous swellings or tumors which emit a crackling sound on pressure. These swellings occur especially on the hind quarter or shoulder and usually cause lameness or stiffness. Other symptoms are rapid breathing, suspension of rumination, and great depression. The disease nearly always terminates fatally in from 12 to 36 hours. After death, the quarter affected appears swollen, and there is a "propped up" position of the legs.

Prevention:

Medicinal treatment of diseased animals is ineffective. Vaccination of well animals is the only known protection. In localities where the disease occurs, all calves should be vaccinated at 6 months of age. If the disease appears, it is due to the presence of the blackleg germ either in the ground of the pasture, feed lot or stable where the animals have been, or in feeding or bedding materials. Therefore, when the disease appears the animals should all be re-

moved from the infected area, all cattle of susceptible age should be vaccinated, and the premises should be disinfected. It is useless to vaccinate diseased animals.

Animals should be withheld from infected premises for two weeks following vaccination because their susceptibility to the disease increases while they are becoming immunized.

The carcasses of all animals dying from the disease should be completely burned, and all premises which have been contaminated by body discharges should be thoroughly disinfected.

Blackleg vaccine is readily obtainable commercially under different trade names in liquid, powder and pellet form. It is injected under the skin with a syringe or other special instrument.

A study of the disease has shown that well-bred cattle and those in good condition are likely to be more susceptible than others. Also that low-lying and deep soils favor the infection.

Farmers' Bulletin No. 1355, "Blackleg, Its Nature, Cause and Prevention," will supply further details of this disease.

HYGIENE AND SANITATION.

Hygiene has as its aim more perfect growth, more vigorous life, less rapid decay and more remote death. Sanitation has as its aim the destruction of, or making harmless, the germs of disease. A more vigorous application of these two principles to livestock production would make unnecessary much of the use of drugs and other medicines in the treatment of disease after it appears.

It is well always to bear in mind that our farm animals have been domesticated from the wild state, and as a rule will withstand adaption to man's needs better when interference with their natural inclinations is least. This means that pure air, clean water, wholesome food, ample exercise and non-exposure to actual disease are essential.

A total of 17 particular practices for the guidance of the stockman who wishes to insure his animals against disease are presented:

How to promote health in livestock:

1. Select healthy foundation stock, as indicated by thrifty appearance, reputable source and diagnostic tests.
2. Provide suitable quarters, as indicated, by freedom from harbored infection, protection against extremes of heat and cold, ample volume of pure air and ventilation, good drainage and plenty of sunlight.

3. Supply adequate amounts of palatable and nutritious feeds considering the proper balance of constituents, mineral and vitamin content, etc.
 4. Furnish an abundant supply of pure water.
 5. Dispose of manure and other animal wastes by prompt removal from quarters occupied by livestock.
 6. Observe herds and flocks frequently so as to detect condition of health.
 7. Immunize animals against specific infections of high mortality.
 8. Avoid visiting places where infection is known to exist.
 9. Apply diagnostic tests for certain diseases such as tuberculosis at regular intervals.
 10. Isolate animals showing signs of illness and all newly purchased stock until certain they do not menace the health of other stock.
 11. Burn or bury deep and cover with quicklime all animals dying on the premises.
 12. Treat for prevention of severe parasitic infestation.
 13. Clean and thoroughly disinfect premises after an infection has appeared.
 14. Do not borrow or lend breeding stock.
 15. Rotate pastures to reduce parasitic infestation.
 16. Avoid the use of "cure-all" nostrums in treating animal diseases.
 17. Obtain expert veterinary service when signs of serious disease appear.
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